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COOPERATIVE EXTENSION SERVICE, PURDUE UNIVERSITY, WEST LAFAYETTE, INDIANA 47907

# Beef Performance Testing—Questions and Answers

*L. A. Nelson and K. G. MacDonald, Animal Sciences Department, Purdue University*

Over the years, performance testing of beef cattle has continued to gain producer acceptance until it is now considered an integral part of beef management. The Cooperative Extension Services or beef improvement associations in many states, including Indiana, offer performance testing programs, as do most of the national breed associations.

This publication attempts to answer some of the more frequently asked questions about performance testing of beef cattle — both on-farm and at a central test station. From the information, we hope that you as an Indiana beef producer will be in a better position to assess the value of this management activity to your enterprise and the type of program that would fit you best. A list of Purdue Extension publications and computer programs dealing with this and related aspects of beef production is given on the last page.

**What is performance testing?** It is a simple, accurate method of obtaining systematic records on the production of each animal in the herd. Performance testing offers beef producers a means of measuring differences among animals in heritable economic traits. It's not a game or contest, but a management tool to be used in improving herd productivity.

**Who should performance test?** Any beef producer, purebred or commercial, should consider performance testing to help evaluate the individual animals in his or her herd. Of course, one doesn't have to performance test; but one does have to compete with those who do.

**Why performance test?** Performance testing provides a basis for comparing cattle handled alike

within a herd or within a test group. Differences among animals in traits of economic value are heritable to a large degree. Thus, systematic measures and use of records in selection will lead to genetic improvement within herds and breeds of cattle, thereby increasing efficiency of production.

**What traits are evaluated?** Those traits that contribute to both productive efficiency and desirability of product should be measured. Regular reproduction, rapid growth, efficient feed conversion, and carcass type preferred by packers, retailers, and consumers are traits of major economic importance. In most programs they are determined by measuring and recording calving ease, birth weight, weaning weight, yearling weight, carcass quality and yield factors. Other optional data that may be included are: frame size, muscling score, hip height, cow weight and scrotal circumference of yearling bulls.

**How can performance test records be used?** Beef performance records are used to increase profits in the following ways:

1. Raise the average performance of the herd for which affect net income, such as percent calf crop and growth rate to market age.
2. Provide a complete herd inventory to use in improving management of the herd.
3. Identify the high-producing cows to keep and the low-producing ones to cull.
4. Aid in selection of replacement heifers and herd bulls.
5. Evaluate each sire within the herd.
6. Provide objective performance data for potential buyers to supplement subjective evaluation by eye.
7. Help advertise the merits of the herd.

**Is there a statewide on-farm performance testing program for Indiana beef producers?**

Yes. The Indiana Beef Performance Testing Program (IBPTP), administered by the Cooperative Extension Service at Purdue University, is available free of charge to all producers in the state. About 200 producers currently participate in the program. Weights and other data are recorded on the farm by the owner, who then sends the records to Purdue for computer processing and summarization; a copy of the 205-day or 365-day summary is then returned to the owner.

**What is required (and optional) to participate in the IBPTP?** The requirements are as follows:

1. Permanently identify each cow and calf.
2. Record number, birth date, sex, dam and, if possible, the sire of each calf.
3. Weigh all calves at weaning, preferably between 180 and 230 days of age.
4. Record yearling weights of herd bull prospects and heifer replacements between 330 and 450 days of age. This is optional but highly recommended in purebred herds.
5. Obtain carcass data on several steers from each sire in seedstock herds (also optional but recommended).

**Should I wait until I have culled some cows and improved my herd before testing?** Definitely not! Start performance testing now so that you will have some basis on which to cull cows or select replacement heifers. Culling cows on their looks alone is often a mistake, since some of the poorest-looking cows may actually wear the heaviest calves. Performance records are management aids to help you make the right decisions.

**How should cows and calves be identified?**

Any permanent numbering system is acceptable; however, the identification should be easily seen to prevent loss of time when cows or calves are weighed. For cows, hot or freeze brands can be used; but a flexible, plastic ear tag combined with a tattoo number is better. For calves, it is best to ear-tattoo each one plus use a flexible, plastic ear tag. (See publication AS-410, "Beef Cattle Identification Methods.")

**How much time does it take to performance test a herd?** Under good conditions, annual time requirement per cow and calf is less than 15 minutes. That includes identification, weighing, and completing performance data forms and cow productivity records, such as AS-416, "Individual Beef Cow Record." The major factor determining time required is the kind of handling facilities available.

Simple, workable corrals and chutes can be built easily with rough lumber or purchased metal panels. Plans and publications are available at your county Extension office. (See publication ID-109, "Handling Facilities for Beef Cattle.")

**Do I need a scale?** In on-farm testing, the producer is responsible to provide scales, either his own or borrowed. Some county or area groups have purchased portable scales, thereby reducing the cost per producer. Reconditioned ones can also be purchased from some equipment firms. A scale is an important item to anyone in the business of producing beef more efficiently.

**Is it necessary to weigh calves at birth?** No. But recording birth weight is encouraged to relate this information to calving ease and growth rate. If calves are not weighed at birth, a standard weight is used for all calves, as recommended by the Beef Improvement Federation (BIF) or the respective national beef breed association.

**When should calves and yearlings be weighed?** To determine adjusted 205-day and 365-day weights, weaning weight must be recorded between 160 and 250 days of age, and yearling weight between 330 and 450 days of age. Of course, the closer to 205 and 365 days you can weigh the animals, the more accurate their adjusted weights will be.

**Which calves or yearlings should be weighed?** Weigh all of them that are the proper age, including that 300-pound calf you'd rather hide! If you weigh just your best animals, the resulting weight ratios will underestimate the potential breeding value of those "best" ones, since they are only compared with themselves and not with the herd average. Also, weighing only a part of your calves will mean incomplete production records for some cows; thus, the average 205-day weight ratio of a cow's offspring won't accurately reflect her productivity.

**Who does the weighing and evaluating?** Again, you the producer are responsible. However, in many counties, IBPTP participants often help each other in weighing and evaluating cattle. Assistance is also available from Cooperative Extension Service personnel to evaluate frame size (body type) and muscling, especially for yearling bulls and heifers.

**If weights increase, will quality go down?** No. Improvement in weaning or yearling weights and in frame size or muscling should go hand in hand. However, frame size and weight are more highly correlated than are weight and muscling. Weight, frame size and muscling are moderate-to-



highly heritable traits—i.e., differences among animals are due more to genetics than to environment, especially at yearling age.

**What is meant by adjusted weight?** It is the weight of an animal standardized for differences which are not heritable, such as age of calf at weighing and age of dam. Actual weaning weights are adjusted to estimate what a calf would have weighed at 205 days of age if its dam had been mature (5-10 years of age). Yearling weights are adjusted to 365 days of age by adding the adjusted 205-day weight and amount of weight gained from weaning to 1 year old.

### How is adjusted 205-day weight determined?

The procedure recommended by BIF is as follows:

1. Pre-weaning avg. daily gain =  $\frac{\text{Actual weaning wt.} - \text{Birth wt.}}{\text{Age in days}}$
2. Est. 205-day wt. = Birth wt. + (Pre-weaning avg. daily gain × 205 days)
3. Adj. 205-day wt. = Est. 205-day wt. + Wt. correction factor for age of dam & sex of calf (Table 1)

These are average adjustments that will over- or under-adjust different breeds or herds. Some national breed associations have developed their own set of correction factors for age-of-dam adjustments to 205-day weight.

### How is adjusted 365-day weight calculated?

Weight at 365 days of age is estimated as follows:

1. Post-weaning avg. daily gain =  $\frac{\text{Yearling wt.} - \text{Weaning wt. (actual)}}{\text{No. of days between weights}}$
2. Adj. 365-day wt. = Adj. 205-day wt. + (Post-weaning avg. daily gain × 160 days)

### Are adjustments made for creep feeding?

No. Because no two producers have the same creep feeding program, it would be impossible to make a standardized correction for type and amount of creep feed. For the most accurate comparisons of individual performance, all calves should be handled alike. If some calves are creep-fed and others are not, they should be handled as two different groups and their performance records summarized separately.

### Are adjustments made for sex of calf?

No. But the average adjusted weight for each sex (bulls, steers and heifers) is printed on the summary. Those averages are used in determining the weight ratio for each calf within each sex group.

**What is the weight ratio?** It indicates the degree of superiority or inferiority, in weight, of an animal relative to the average weight of all animals of that particular sex and group. Weight ratio is calculated as:

$$\text{Wt. ratio} = \frac{\text{Animal's adj. wt.}}{\text{Sex group avg. adj. wt.}} \times 100$$

It is used to quickly determine the relative ranking of individuals within a group. Any animal with a weight ratio above 100 is heavier than the sex or group average; likewise, an animal whose weight ratio is under 100 is lighter than the group average.

**What are 'contemporaries'?** This refers to the number of animals reared, or tested, as one group. Sometimes, number of herd mates or number tested is used instead of number of contemporaries. When a single animal is tested, the number of contemporaries is one, and the animal's weight ratio or test index is 100. On the other hand, if 205-day weights of 47 bull calves were summarized as one group from one herd, the number of contemporaries would be 47. Pay particular attention to number of contemporaries when comparing weight ratios or test indexes of animals from different herds or tests. The greater the number tested, the more emphasis you can place on their performance records as a measure of comparison.

**How can one compare calves born in two different seasons?** Records from calves born within a 2- or 3-month period should be summarized together. Those born beyond that initial 3-month period should probably constitute another performance record group, because seasonal and management differences can markedly influence calf weights. For example, spring calves commonly outweigh fall calves by 25 pounds or more at the same age. Thus, animals born in different seasons can be compared more accurately on the basis of their weight ratios than on their actual or adjusted weights.

**Table 1. Weight Correction Factors for Adjusting Calf Weaning Weights.**

Age of dam	Add to 205-day wt. for:	
	Male calves	Female calves
2 years	60 lbs.	54 lbs.
3 years	40 lbs.	36 lbs.
4 years	20 lbs.	18 lbs.
5-10 years	0 lbs.	0 lbs.
11 years plus	20 lbs.	18 lbs.

**Should on-farm performance records be used to compare different herds?** No. Most differences in performance between herds are environmental—i.e., due to nutrition and management. Therefore, comparison of animals from two different herds should be based on weight ratios rather than actual or adjusted weights. *Limited* between-herd comparisons can be made among bulls tested at a central test station where environment and diet are the same. But we emphasize 'limited,' because the pre-test environment (creep feeding, age at weaning, milk production of the dam, etc.) influences average daily gain on test, especially for the first 56-84 days.

**Are on-farm testing records in the IBTP confidential?** Yes! Each herd is assigned a code number, and all records are processed and filed according to that code. Herd averages and other on-farm performance data are not made public unless you request that information from your herd be made available to someone.

**Can performance testing records be used to help advertise my herd?** Yes! But performance data used in ads or sale catalogs should be brief, pertinent, current, complete and authentic. Use calving data, 205-day and 365-day weights and ratios, test index, plus carcass quality and yield grade data. Avoid using misleading or non-standardized data such as: "This calf weighed 363 pounds at 131 days of age," or "A son of this bull weighed 1320 pounds at 14½ months."

**Should I participate in my breed association performance program?** Yes, especially if you are a seedstock producer. Most national beef breed associations sponsor a performance testing program of their own. Your breed association has the pedigree information for your cattle, so it's logical that they should also process performance data and issue performance pedigrees. To do so, they need both the pedigree and performance information for your cattle. Some breed associations also have National Sire Evaluation Programs, likewise very important for seedstock producers.

**How should bulls be gain-tested?** Wean and weigh bull calves at 6-8 months of age; then feed a uniformly mixed, moderate-energy ration (60-70 percent TDN) for at least 140 days to bring out genetic differences in gainability. A recommended ration is a full-feed of corn silage, plus 1 percent of bodyweight of corn grain and 2 pounds of a 40 percent protein supplement (or equivalent) per head daily. If corn silage is not available, full-feed

alfalfa or mixed legume-grass silage, haylage or hay, plus 1.5 percent of bodyweight of corn grain and 1 pound of a 40 percent protein supplement (or equivalent) per head daily. To validly compare their gain on test, feed all bulls the same ration for the same length of time.

**Should bulls be tested at home or at a central station?** Either method is acceptable. A central testing station can supplement, but should not replace, on-farm testing. It may be more expensive than home testing, except for breeders who do not have the facilities to test bulls at home. Preferably, bulls should be accepted for central testing only if the breeder is actively participating in an on-farm performance testing program, and if his bulls meet rigid requirements for weight per day of age, or 205-day weight ratio, soundness and health. As mentioned previously, central tests have limited value in estimating genetic differences between herds.

**Is there a central testing program in Indiana?** Yes. The Indiana Beef Evaluation Program (IBEP) began a central testing program in 1976, and now conducts two performance tests each year, one during spring-summer and the other in fall-winter. The IBEP Test Station is located at the Lynnwood-Purdue Agricultural Center near Carmel, Indiana.

**What are the purposes of the IBEP Test Station?** There are several objectives:

1. To promote performance testing of beef cattle in Indiana and to serve as an educational tool to acquaint producers with its overall value.
2. To complement on-farm performance testing of cattle.
3. To provide common environmental conditions for evaluating the performance of young bulls and steers.
4. To assist breeders in identifying sires whose progeny excel in growth rate, feed conversion and carcass value.
5. To aid beef producers in obtaining superior performance-tested bulls.

**Who can participate and what animals are eligible for testing?** Any beef producer, including breeders from outside Indiana, may participate if animal eligibility requirements are met. Presently, the program has about 150 cooperators each year. In general, purebred and recorded bull calves, 6-10 months of age, are eligible if they meet health, soundness and performance requirements. Steers are also accepted for gain-testing and carcass evaluation in some tests.

**What is the IBEP test index?** Bulls at the Test Station are indexed and ranked within each breed by giving equal weight to their average-daily-gain ratio and weight-per-day-of-age ratio. The test index combines a bull's 140-day average daily gain at the Test Station with his lifetime weight per day of age. A bull whose test index is 112.3 performed at 12.3 percent above the average of all bulls of his breed in that test. Likewise, a test index of 91.0 indicates that his performance was 9 percent below breed average in that test.

**Are central testing records in the IBEP confidential?** No. Like the IBTP, each herd represented at the Test Station is assigned a code number, and all records are processed and filed by that number. The performance data recorded are made available to the public.

**How do I obtain performance data on steers?** This is done by entering steers in county, area or statewide beef carcass contests or in the IBEP. If you would want to take a few steers to a local locker plant for slaughter and obtain carcass data, contact Dr. John Forrest, Animal Sciences Department, Smith Hall, Purdue University, West Lafayette, IN 47907 (phone 317/494-8283) for details on how to record the necessary data. There is a 'FACTS' computer program available to run at your county Extension office which will summarize these data and rank the carcasses, depending upon how much is known about each animal's performance.

**Will performance testing mean more efficient production?** Chances are, yes! However, such a management tool will only be as successful as the person using it. The integrity of the producer, accuracy of the data recorded and application of the resulting information are keys to the success of any performance testing program.

**How do I enroll in the on-farm Indiana Beef Performance Testing Program?** Obtain information and data forms from your county Extension office or by writing: Beef Performance Testing,

Animal Sciences Department, Lilly Hall of Life Sciences, Purdue University, West Lafayette, IN 47907.

**How do I enter bulls or steers for testing in the central station Indiana Beef Evaluation Program?** Obtain information and entry forms from your county Extension office, or by writing: Indiana Beef Evaluation Program, Room 3-224, Lilly Hall of Life Sciences, Purdue University, West Lafayette, IN 47907.

#### **Related Publications and Computer Programs**

Indiana residents may order single copies of up to 10 different publications free of charge from their county Cooperative Extension Service office or by writing the CES Publications Mailing Room, AGAD Building, Purdue University, West Lafayette, IN 47907.

"Assisting the Beef Cow at Calving Time" (AS-405)

"Beef Cattle Identification Methods" (AS-410)

"Beef Herd Management Calendar—Spring Calving Program" (AS-414)

"Cow-Calf Record Book" (AS-412)

"Creep Feeding of Beef Calves" (AS-415)

"Handling Facilities for Beef Cattle" (ID-109)

"Individual Beef Cow Record" (AS-416)

"Management and Economics of a Beef Cow Herd AI Program" (ID-100)

"Management of the Beef Calf Crop" (AS-397)

"Selection and Management of Herd Bulls" (AS-395)

"Selection, Management and Nutrition of the Cow Herd" (AS-396)

"Troubleshooting the Cow-Calf Operation" (ID-138)

"Twenty Ways to Wean More Pounds of Beef" (AS-406)

Also available at your county Extension office are FACTS computer programs designed to aid in decision making in the beef enterprise. Some examples of programs available for your use are:

"Beef Carcass Performance Evaluation" (FX-53)

"Beef Ration Analyzer" (FX-12)

"Feeder Cattle Breakeven" (FX-36)

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